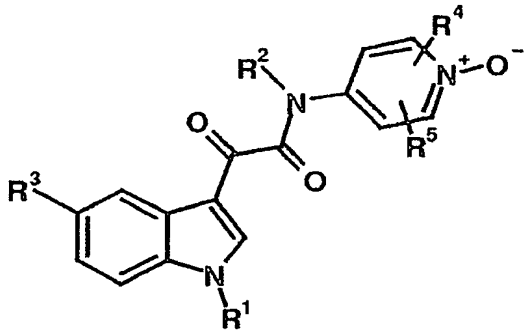
Claims

1. A compound of the formula 1



(1)

wherein

R^1

(i) is $-C_{1-10}$-alkyl, straight-chain or branched-chain, optionally mono- or polysubstituted by -OH, -SH,
$-NH_2$, $-NHC_{1-6}$-alkyl, $-N(C_{1-6}\text{-alkyl})_2$, $-NHC_{6-14}$-aryl, $-N(C_{6-14}\text{-aryl})_2$, $-N(C_{1-6}\text{-alkyl})(C_{6-14}\text{-aryl})$, $-NO_2$, -CN, -F, -Cl, -Br, -I, $-O-C_{1-6}$-alkyl, $-O-C_{6-14}$-aryl, $-S-C_{1-6}$-alkyl, $-S-C_{6-14}$-aryl, $-SO_3H$, $-SO_2C_{1-6}$-alkyl, $-SO_2C_{6-14}$-aryl, $-OSO_2C_{1-6}$-alkyl, $-OSO_2C_{6-14}$-aryl, -COOH, $-(CO)C_{1-5}$-alkyl, $-COO-C_{1-5}$-alkyl, $-O(CO)C_{1-5}$-alkyl, by mono-, bi- or tricyclic saturated or mono- or polyunsaturated carbocycles with 3-14 ring members or/and by mono-, bi- or tricyclic saturated or mono- or polyunsaturated heterocycles with 5-15 ring members and 1-6 heteroatoms, which are preferably N, O and S,
wherein the C_{6-14}-aryl groups and the carbocyclic and heterocyclic substituents in turn may optionally be substituted one or more times by $-C_{1-6}$-alkyl,
-OH, $-NH_2$, $-NHC_{1-6}$-alkyl, $-N(C_{1-6}\text{-alkyl})_2$, $-NO_2$, -CN, -F, -Cl, -Br, -I, $-O-C_{1-6}$-alkyl, $-S-C_{1-6}$-alkyl, $-SO_3H$, $-SO_2C_{1-6}$-alkyl, $-OSO_2C_{1-6}$-alkyl, -COOH, $-(CO)C_{1-5}$-alkyl, $-COO-C_{1-5}$-alkyl or/and $-O(CO)C_{1-5}$-

alkyl, and wherein the alkyl groups on the carbocyclic and heterocyclic substituents in turn may optionally be substituted one or more times by -OH, -SH, $-NH_2$, -F, -Cl, -Br, -I, $-SO_3H$ or/and -COOH, or

(ii) is $-C_{2-10}$-alkenyl, mono- or polyunsaturated, straight-chain or branched-chain, optionally mono- or polysubstituted by -OH, -SH, $-NH_2$, $-NHC_{1-6}$-alkyl, $-N(C_{1-6}\text{-alkyl})_2$, $-NHC_{6-14}$-aryl, $-N(C_{6-14}\text{-aryl})_2$, $-N(C_{1-6}\text{-alkyl})(C_{6-14}\text{-aryl})$, $-NO_2$, -CN, -F, -Cl, -Br, -I, $-O-C_{1-6}$-alkyl, $-O-C_{6-14}$-aryl, $-S-C_{1-6}$-alkyl, $-S-C_{6-1}$-aryl, $-SO_3H$, $-SO_2C_{1-6}$-alkyl, $-SO_2C_{6-14}$-aryl, $-OSO_2C_{1-6}$-alkyl, $-OSO_2C_{6-14}$-aryl, -COOH, $-(CO)C_{1-5}$-alkyl, $-COO-C_{1-5}$-alkyl, $-O(CO)C_{1-}$-alkyl, by mono-, bi- or tricyclic saturated or mono- or polyunsaturated carbocycles with 3-14 ring members or/and by mono-, bi- or tricyclic saturated or mono- or polyunsaturated heterocycles with 5-15 ring members and 1-6 heteroatoms, which are preferably N, O and S,
wherein the C_{6-14}-aryl groups and the carbocyclic and heterocyclic substituents in turn may optionally be substituted one or more times by $-C_{1-6}$-alkyl, -OH, $-NH_2$, $-NHC_{1-6}$-alkyl, $-N(C_{1-6}\text{-alkyl})_2$, $-NO_2$, -CN, -F, -Cl, -Br, -I, $-O-C_{1-6}$-alkyl, $-S-C_{1-6}$-alkyl, $-SO_3H$, $-SO_2C_{1-6}$-alkyl, $-OSO_2C_{1-6}$-alkyl, -COOH, $-(CO)C_{1-5}$-alkyl, $-COO-C_{1-5}$-alkyl or/and $-O(CO)C_{1-5}$-alkyl,
and wherein the alkyl groups on the carbocyclic and heterocylic substituents in turn may optionally be substituted one or more times by -OH, -SH, $-NH_2$, -F, -Cl, -Br, -I, $-SO_3H$ or/and -COOH,

R^2 is hydrogen or $-C_{1-3}$-alkyl,
R^3 is a hydroxyl group,

R^4 and R^5 may be identical or different and are

hydrogen, $-C_{1-6}$-alkyl, -OH, -SH, $-NH_2$, $-NHC_{1-6}$-alkyl, $-N(C_{1-6}$-alkyl$)_2$, $-NO_2$, -CN, $-SO_3H$, $-SO_3-C_{1-6}$-alkyl, -COOH, $-COO-C_{1-6}$-alkyl, $-O(CO)-C_{1-5}$-alkyl, -F, -Cl, -Br, -I, $-O-C_{1-6}$-alkyl, $-S-C_{1-6}$-alkyl, -phenyl or -pyridyl, wherein the phenyl or pyridyl substituents in turn may optionally be substituted one or more times by $-C_{1-3}$-alkyl, -OH, -SH, $-NH_2$, $-NHC_{1-3}$-alkyl, $-N(C_{1-3}$-alkyl$)_2$, $-NO_2$, -CN, $-SO_3H$, $-SO_3C_{1-3}$-alkyl, -COOH, $-COOC_{1-3}$-alkyl, -F, -Cl, -Br, -I, $-O-C_{1-3}$-alkyl, $-S-C_{1-3}$-alkyl, or/and $-O(CO)C_{1-3}$-alkyl, and where the alkyl substituents in turn may optionally be substituted one or more times by -OH, -SH, $-NH_2$, -F, -Cl, -Br, -I, $-SO_3H$, $-SO_3C_{1-3}$-alkyl, -COOH, $-COOC_{1-3}$-alkyl, $-O-C_{1-3}$-alkyl, $-S-C_{1-3}$-alkyl or/and $-O(CO)-C_{1-3}$-alkyl,

or salts of the compounds of formula 1.

2. A compound as claimed in claim 1 having an asymmetric carbon atom in the D form, the L form and D,L mixtures, and in the case of a plurality of asymmetric carbon atoms also the diastereomeric forms.

3. A compound as claimed in claim 1 or 2, wherein R^2 is hydrogen or a methyl group.

4. A compound as claimed in one of claims 1 to 4, wherein at least one of R^4 and R^5 is a halogen atom.

5. A compound as claimed in any of claims 1 to 4 selected from:

N-(3,5-dichloro-1-oxopyridin-4-yl)-[1-(4-fluorobenzyl)-5-hydroxyindol-3-yl]glyoxylamide

N-(3,5-dichloro-1-oxopyridin-4-yl)-[1-(4-chlorobenzyl)-5-hydroxyindol-3-yl]glyoxylamide

N-(1-oxopyridin-4-yl)-[1-(4-fluorobenzyl)-5-hydroxyindol-3-yl]glyoxylamide

N-(3,5-dichloro-1-oxopyridin-4-yl)-[1-(2,4-dichlorobenzyl)-5-hydroxyindol-3-yl]glyoxylamide

N-(3,5-dichloro-1-oxopyridin-4-yl)-[5-hydroxy-1-(3-nitrobenzyl)-indol-3-yl]glyoxylamide

N-(3,5-dichloro-1-oxopyridin-4-yl)-[1-(2,6-difluorobenzyl)-5-hydroxyindol-3-yl]glyoxylamide

N-(3,5-dichloro-1-oxopyridin-4-yl)-(5-hydroxy-1-isobutylindol-3-yl)glyoxylamide

N-(3,5-dichloro-1-oxopyridin-4-yl)-(1-cyclopropylmethyl-5-hydroxyindol-3-yl)glyoxylamide

N-(3,5-dichloro-1-oxopyridin-4-yl)-[5-hydroxy-1-(4-hydroxybenzyl)-indol-3-yl]glyoxylamide

N-(3,5-dichloro-1-oxopyridin-4-yl)-N-methyl-[1-(4-fluorobenzyl)-5-hydroxyindol-3-yl]glyoxylamide

and physiologically tolerated salts thereof.

6. A compound as claimed in any of claims 1 to 5 selected from:
N-(3,5-Dichloro-1-oxopyridin-4-yl)-[1-(4-fluorobenzyl)-5-hydroxyindol-3-yl]glyoxylamide and physiologically tolerated salts thereof.

7. A process for preparing compounds of formula 1, which comprises converting N-(pyridine-4-yl)-indol-3-ylglyoxylamides of formula 2 into the analogous N-(1-oxopyridin-4-yl)-indol-3-ylglyoxylamides of formula 1 by treatment with an oxidizing agent, and liberating the compounds of

formula 1 by eliminating a protective group.

8. The process as claimed in claim 7, wherein a peracid, in particular m-chloroperbenzoic acid or/and peracetic acid, is used as oxidizing agent.

9. The use of the compounds of formula 1 as claimed in any of claims 1 to 6 as therapeutic active ingredients for producing drug products for the treatment of disorders in which inhibition of phosphodiesterase 4 is therapeutically beneficial.

10. The use of the compounds of formula 1 as claimed in any of claims 1 to 6 as therapeutic active ingredients for producing drug products for the treatment of disorders associated with the effect of eosinophils.

11. The use of the compounds of formula 1 as claimed in any of claims 1 to 6 as therapeutic active ingredients for producing drug products for the treatment of disorders associated with the effect of neutrophils.

12. The use of the compounds of formula 1 as claimed in any of claims 1 to 6 as therapeutic active ingredients for producing drug products for the treatment of hyperproliferative disorders.

13. A drug product comprising one or more compounds as claimed in any of claims 1 to 6 in addition to conventional physiologically tolerated carriers and/or diluents and excipients.

14. A process for producing a drug product as claimed in claim 13, which comprises one or more compounds as claimed in any of claims 1 to 6 being processed with conventional pharmaceutical carriers and/or diluents and other excipients to pharmaceutical

preparations, or being converted into a form which can be used therapeutically.

15. The use of compounds of the general formula 1 as claimed in any of claims 1 to 6 and/or of drug products as claimed in claim 13 alone or in combination with one another or in combination with other active pharmaceutical ingredients.